SOUTH BAY WATER RECYCLING

Coast Redwood Tree Management and Irrigation in Santa Clara Valley

January 2006

The California coast redwood, ***Sequoia sempervirens,*** is the tallest known tree in the world. Its native range extends only along a narrow strip of coastal California from southern Monterey County into the southwestern corner of Oregon. The most impressive trees are located along the north coast, where winter rainfall is high and summer fog provides an almost continuous cooling drip.

Redwood trees in the Santa Clara Valley

The coast redwood is a highly favored landscape tree used for residential, commercial, and park plantings in inland areas along the length of California, including the Central Valley and along Interstate 5. While widely grown in the Santa Clara Valley, they attain only a fraction of the stature of the native stands. Their generally good performance is remarkable given the Valley's unpredictable rainfall patterns, Mediterranean climate with hot summers, air pollution, disease organisms, soil compaction and variations in irrigation and soil management practices.

In the last several years, University of California Cooperative Extension farm advisors from all over California have reported problems with redwoods, including browning and other symptoms of decline. In response to questions from several customers, South Bay Water Recycling (SBWR) and the Santa Clara Valley Water District have undertaken studies in conjunction with scientists and arborists to determine whether recycled water plays a role. As yet, no information is available on the redwood's tolerance or sensitivity to salts contained in irrigation water (potable or recycled), although studies are continuing.

Tips for Growing Redwood Trees

While studies cited above are continuing, it is important to note that redwoods are browning in areas of the Valley without access to recycled water. Good site management is the key to successful landscapes. The basic requirements for growing healthy redwood trees, whether using recycled or potable water, begins with an understanding of the soil. It is not unusual to find deposits of radically different soil types within a single site. Perhaps the most difficult soil structure to work with is heavy clay so common in this area. Foot traffic, cultivation and turf equipment used on wet clay soils can result in serious compaction, which limits the ability of water to reach the roots or drain sufficiently. The following measures are helpful in fostering the growth of healthy redwood trees.

Maintain a soil pH around 6.5. pH is a measure of acidity or alkalinity, which influences the availability of nutrients in a soil. The soil pH tolerance of coast redwood ranges from an acid pH 5.0 to the alkaline pH 7.5, with an optimum pH of 6.5. Soil fertility is based on the availability of three basic nutrients: nitrogen, phosphorus, and potassium. Soils must also contain small amounts of other micronutrients and trace elements essential to healthy growth. A soil test can eliminate the use of unneeded fertilizers, saving money and protecting the environment from unnecessary chemicals.

Amend your soil to improve drainage. Drainage rates, highly variable depending on soil type and moisture content, should be no less than one-quarter inch per hour nor exceed two inches per hour. Recommendations to improve drainage include aerating the soil, adding organic material, or adding soil amendments such as gypsum. For more detailed information on soil drainage refer to the landscape guide noted below.

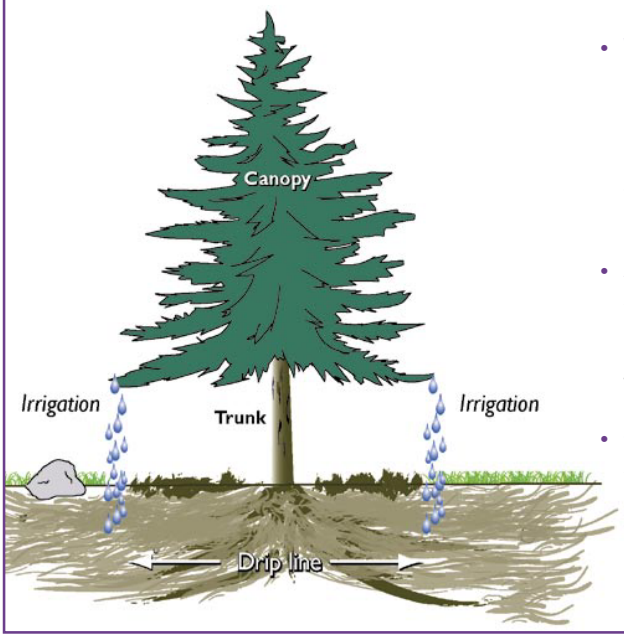
Water thoroughly. Redwoods prefer well-drained, moist soil. Turf watering alone will not suffice. Maintain soil moisture by routinely applying enough water to wet each tree's root zone. Although this zone is typically shallow, it often spreads a hundred feet or more in all directions. Watering in this manner will also help keep the potential accumulation of salts from potable and recycled water at manageable levels.

Observe your trees. There is no substitute for thorough field observation. Needle browning, a nonspecific symptom, is serious but easily detected. Get to know the signs of moisture stress, nutrient deficiencies or toxicity, insects, and disease pathogens.

Check the SBWR website for additional information and detailed water quality results. Recycled water is analyzed frequently to help determine its suitability for various plant species, and detailed test results are posted on SBWR's website (***www.sanjoseca.gov/sbwr***). Currently, SBWR and its partner agencies are focused on studying the impact of recycled water and other stressors on redwoods. These studies are expected to be completed in late 2006. At that time, further information will be posted on the website, including any site-specific solutions for tree irrigation.

Landscape guide available. General information is available in the landscape guide, "*Greener Landscapes with Recycled Water*," posted on the SBWR website at ***www.sanjoseca.gov/sbwr/LandscapeGuide/GuideIntro.htm***.

Watering Tips



- **Know your tree**
  Coast redwood trees are not native to the Santa Clara Valley and need adequate irrigation to perform well in our semi-arid climate. They are not drought tolerant and perform best in well-drained, moist soil.
- **Water deeply but avoid runoff**
  Roots can extend a hundred feet or more beyond the needled canopy or drip line of the tree. Most of the tree's water absorbing roots are in the top 12 to 24 inches of soil. Apply water in multiple locations under the drip line to reach the critical root zone to a depth of 12 inches. To avoid runoff in heavy clay soils, or on soil mounds, pulse-irrigation or multiple drip emitters may be a solution.
- **Apply the correct amount of water**
  Adjust your watering schedules with the weather and seasons. Irrigate early in the morning, when winds are calm and evaporation is low. Examine the soil frequently, making sure it is not too wet or too dry. Low-volume systems with microsprinklers or flat nozzle spray heads are ideal for maintaining humidity under the tree canopy.
- **Conserve soil moisture**
  Apply organic mulch within the drip line to cool the soil surface, conserve moisture, prevent weed growth, provide organic matter and improve landscape aesthetics. The recommended mulching depth is 2 to 2.5 inches. Leave a 6 to 8 inch space of bare soil between the tree trunk and mulching material.

For additional information contact your water retailer at:

San Jose Municipal Water
Eric Rosenblum, Manager, South Bay Water Recycling
408-277-3671

City of Milpitas
Pam Lowe, Associate Civil Engineer
408-586-3304

City of Santa Clara Water & Sewer Utilities
Alan Kurotori, Director
408-615-2000

San Jose Water Company
Melania Corbin, Water Conservation Supervisor
408-279-7801

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